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Abstract

This paper describes a project for the development, testing, and initiation of a SAP Student Marketplace for the Advancement of Research and Training (SMART). SAP SMART aims to create a simulated economic environment where participating institutes of higher learning will be able to deliver a world-class, technology-enabled education utilizing the mySAP.com e-business applications to their full extent. There are five institutes of higher learning developing this marketplace, with three US Universities (South Dakota, Missouri and Chico State), one South American University (University of Sao Paulo), and one Australian University (Queensland University of Information Technology).

This project will be based on a global business process scenario, which includes in the first instance the roles of suppliers, manufacturers, retailers and end consumers. Each participating institute will take one of these roles. The required design, implementation and execution of these collaborative scenarios will add significant value to the local education in Enterprise Systems.

Introduction

Enterprise systems are being introduced into the Information Systems curriculum in a variety of institutions. There is a need to develop IT students that have business knowledge, and business students that have IT knowledge (Microsoft Press, 1998, Gartner Group, 1998) and Enterprise Systems provide a platform in which students can acquire this knowledge. A number of efforts to link academic study towards industry needs took place in order to achieve this goal. Professional societies have defined a body of requisite IT knowledge (e.g. ACS Core Body of Knowledge 1997) and IT Societies around the world have called for increased relevance of IT education (British Computer Society, 1999, IEEE, 1999, ACM, 1997, ACM, 1999, Australian Computer Society 2000). These activities have led to various the formation of collaborative curriculum committees to address this issue (IS 97, Davis et al., 1997), (ISCC'99, Lidtke and Stokes, 1999), (IS 2000, Longenecker et al., 1999).

In particular, the Information Systems Centric Curriculum document (Lidtke and Stokes 1999) called for the use of an inverted curriculum approach to ground student learning in a real world experience that gives the overall context of the work of Information Systems specialists. Again, an Enterprise System provides this rich teaching medium, with populated business processes representing in an agreed process modeling standard (UML). The ES technical environment is a complex example of all the components needed to power a multi-national organisation - client server environments using centralised database systems accesses through web enabled front ends. The newer extensions to Enterprise Systems to embrace Supply Chain Management and Customer Relationship management also provides the platform to teach about the modeling and technologies that service the E-Commerce world.

Over the last several years, a number of universities internationally have been using Enterprise Resource Planning (ERP) Software (SAP R/3, PeopleSoft, Oracle Financials, OneWorld) as a means of providing access to these functioning application systems. Numerous IS conferences have had mini-tracks directly addressing this adoption of ERP into the curriculum (AMCIS 1999, AMCIS 2000, DSI 1999, DSI 1999, ECIS 1999, ECIS 2000, ACIS 1998, ICIS 1998). Gable and Rosemann (1999) give an overview about SAP-related activities at universities. Hawking (1998), Lederer-Antonucci (1998) and Watson and Schneider (1999) discuss success factors for the integration of ERP into the IS curriculum. Scott (1999) analyses different learning styles for their appropriateness regarding ERP. Stewart et al. (1999), Watson and Noguera (1999) and Watson et al. (1999) reflect their experiences in teaching ERP. Hawking et al. (1999) reviews ERP-activities at Australian Universities, and shows how such curriculum addresses the IS '97 curriculum.

Though the awareness for the need to teach Enterprise Resource Planning increased significantly over the last years, appropriate literature that goes beyond an explanation of product-specific functionality is still missing. Furthermore, the available material from ERP providers does not target universities' needs. There is a requirement to find a cost-effective means to develop a set of teaching cases designed to overcome this situation.

A collaborative development project has been established between five universities to address this shortfall. This project will develop, pilot and populate a virtual enterprise system exercising the full range of business processes found in an extended enterprise. This extended enterprise will have supplier, vendors, retailers and manufacturers. Each participating institute will take one of these roles. The required design, implementation and execution of these collaborative scenarios will add significant value to the local education in Enterprise Systems. Student teams will use this environment for demonstrating business processes within each component, and can use the architecture to demonstrate the functions of E-business.

The SAP SMART pilot project will provide a mechanism for the participants (students, lecturers, and schools) to employ the mySAP.com e-business environment in stimulated business decisions initiated at most of the levels of both undergraduate and graduate business, information systems, and engineering education.

To elaborate on this project, we next discuss the project vision and then define its goals and objectives. We then discuss the project scope, and close with the project plan.

Project Vision

The project vision is to develop and test a role-based, technology-enabled marketplace that connects five international schools and their students in a virtual industry that encourages and facilitates "real-world" undergraduate, graduate, and executive education. The proposed system will emulate a worldwide business process from the viewpoints of all levels of management within manufacturer, supplier, retailer and end customer environments. Students will get the unique experience of an elaborated hands-on e-commerce solution. It will allow students to test their decision-making skills at both the tactical and strategic management levels while concurrently providing a solid foundation for education and training across a broad spectrum of student experience levels. Furthermore, it will educate all participants in virtual teamwork.

SAP SMART's pilot business environment will enable student teams to interact between the participating schools in the operation of a limited, electronic business simulation marketplace. It will provide a unique and challenging opportunity where students will use prior knowledge and concepts garnered in their education to make decisions that will ultimately lead to a better understanding of business and an enhanced set of skills and tools.

Once the initial schools are satisfied with the simulated environment, its usability and stability, the vision is to expand the group of marketplace participants by inviting additional international schools to enter the game. Concurrently, it is expected that the system will be modified to permit testing and assessment of new SAP products and partner products in this virtual marketplace. Finally, this project and its deliverables could eventually become a part of a Global Solutions Center offering the advantage of a functioning environment that is capable of quickly assessing and demonstrating the feasibility of new business functionality.

Project Goals and Objectives

The project has several primary goals and objectives. Each of these goals and objectives is important and none is senior to another. These include:

- To create a "real-world" technology-enabled, international student marketplace using the mySAP.com applications as core technology.

- To create a teaching environment that both encourages and supports the on-going use of the student marketplace for teaching and decision-making.
- To create role-based, pedagogical materials for use in introductory, core, and advanced classes for undergraduate, graduate, and executive education in business, information systems, and engineering.
- To create a data warehouse of stimulated, "real-world" information over a series of years that can be used to stimulate research and the development of new ideas.

In order to accomplish these goals and objectives, several things must be completed. These include, in order:

1. Define and select a SAP SMART industry for the simulated environment. The industry must be amenable to expansion and contraction of the number of participants as required by the participation levels for SAP University Alliance Program (UAP) schools globally.
2. Designate firms at the manufacturing, supplier, and retail levels for the selected SAP SMART industry. This division of the initial schools must provide for a balanced set of products and services necessary for a realistic business simulation.
3. Simulate the activities of the various businesses in the environment. Amongst the several things that must be considered are pre-defined purchasing, production, sales, distribution, accounting, product quality management, customer relationship management, and further economic factors.
4. Prepare the pilot student teams for the simulated e-business environment.
5. Pilot the project to the participating schools.
6. Modify and adjust the pilot as necessary.
7. Run second pilot of project with participating schools.
8. Expand the pilot project to include a total of 15 to 20 schools by January 2003.
9. Provide a simulation environment for SAP employee and executive education.
10. Provide a simulation environment for assessment of business functionality in new SAP and/or partner products.

These elements are summarised in Figure 1 below.

A Fast Forward Vision of the Future of the SAP SMART Project

The operational environment and simulation of business decision-making in the SAP SMART pilot project is designed to enable participants to interact in role-based activities at all levels of their studies. The exercises and experiences will facilitate management training across all levels, undergraduate, graduate, and executive programs, of the curriculums for business, information systems, and engineering studies including:

1. Tactical Management: Freshmen and sophomore students will be introduced to fundamental day-to-day business operations concepts in introductory classes that teach business integration and fundamentals using the mySAP.com environment. These classes support and create the independent demand attributes to the overall marketplace through the initiation of purchases for their respective institutions and student teams. They will know of these products and services as the result of work completed by the core classes of participating institutions.

2. Operations Management: Required core classes will discuss, consider, and alter (as necessary) the structure/ organization/operations of the specific school 's company, including the development and marketing of their products to other institutions in the marketplace as a result of on-going market conditions. Their business will be supported by the decisions made at the strategic management level of the project.

3. Strategic Management: Advanced, non-required classes will serve to provide support activities for configuration and implementation of the SAP SMART environment for an institution's company and it's subsidiaries or affiliates. If configuration and consulting support courses are not offered at an institution, the marketplace will provide for the purchase of these services from other institutions. The overall direction for the advanced configuration and implementation will be driven by policy analysis conducted in upper division and graduate classes.

4. Process Engineering: Participants of Process Engineering classes will analyze the overall business process and contribute to the design and the continuous modification of the business blueprint. They will apply the ValueSAP methodology and use state of the art business modeling tools such as the ARIS-Toolset. based on the SAP reference process models and c-Business scenarios, these students will individualize the models for the specific purposes of the SAP SMART project. These students will be most likely post-grad. students.

5. Information Technology: Advanced students will be able to analyse the system requirements, engage in systems design and systems management activities, and explore issues of e-commerce and technical development for e-commerce. The full range of data communications and internet courses can be grounded in the architecture of mySAP applications.

6. Policy Analysis: Policy classes, at both the undergraduate and graduate levels, will use the database to develop and analyze data in order to develop recommendations on direction and operations of the company into the future.

7. Executive Education: These programs of study will use the outcomes from operations of the SAP SMART marketplace to analyze the past decisions made by students at all levels of the organization. Their efforts will be focused at personal education and at initiating improvements to the marketplace for the benefit of all users.

As the pilot project proceeds, the schools involved with production, supplier, and retailer roles will be required to facilitate a process of continuous improvement. These improvements could include alternative methods for the production, new materials, and elaborated customer relationship. Methods of analysis for market variables including economic forecasts and customer satisfaction indicators involving all aspects of business in the processes of making, buying, selling, and tracking the activities of the company.

SAP SMART Core Business Concepts

The students will be exposed to many learning experiences in business, information systems, and engineering throughout the life of the project. Three of the underlying core business concepts of this project are economic demand, systems development, and decision-making. Initially, students will experience first-hand the impact of economic demand on all the business processes of an organization. This will be accomplished through the use of case exercises where students generate and respond to independent demand. It is anticipated that most of the students from all of the participating schools will be exposed to this component of the project.

Systems development is the second core business concept. It is at this stage that students will be exposed to the inner and inter-enterprise workings of SAP and mySAP.com. Core required classes will be responsible for the on-going maintenance of their school's company. This will include configuration, implementation, systems monitoring, master data creation and maintenance, and any configuration changes needed over time.

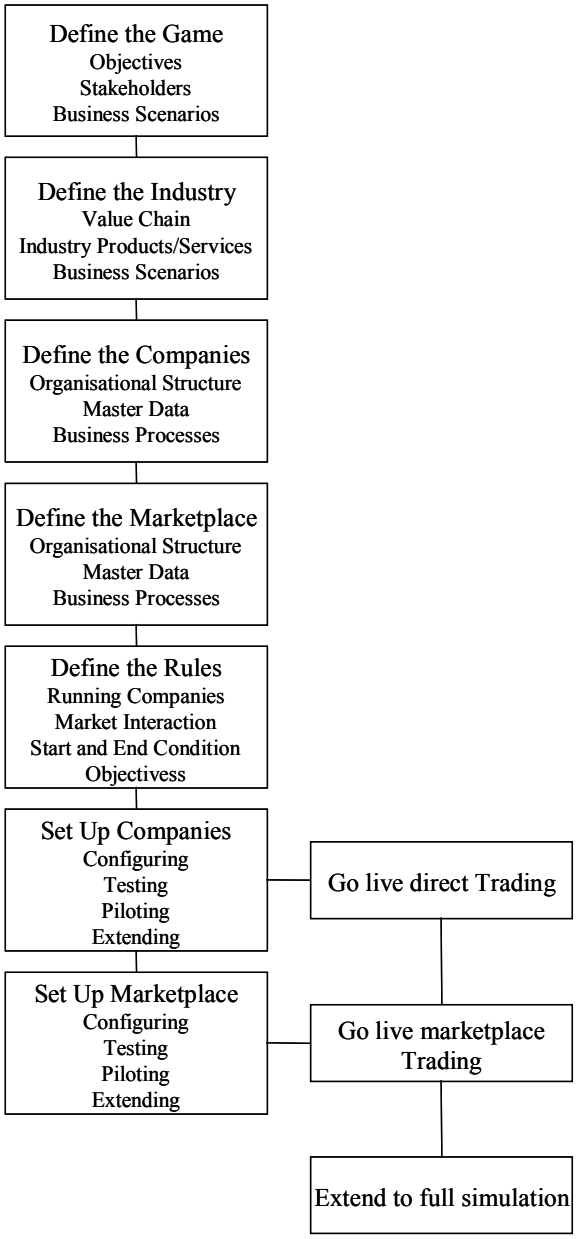

Figure 1. SAP SMART Workbreakdown Components

The final core business concept is decision-making. This component encompassed student's analyzing and reporting on data/information that has been gathered by the system. They will be deciding what data is important, how to make it meaningful, which reports are available and which ones need to be created, and finally what decisions can and will be made using the information.

These business elements are shown in Figure 2.

From the Information Systems point of view, both the enabling technologies and systems development can be the focus of the study and interaction. There are activities which will require the modeling and development of collateral specialist systems (improving reporting systems, integrating disparate e-commerce systems, developing and testing new optimisation systems). This teaching environment provides an integrated experience for students in business, engineering and information systems.

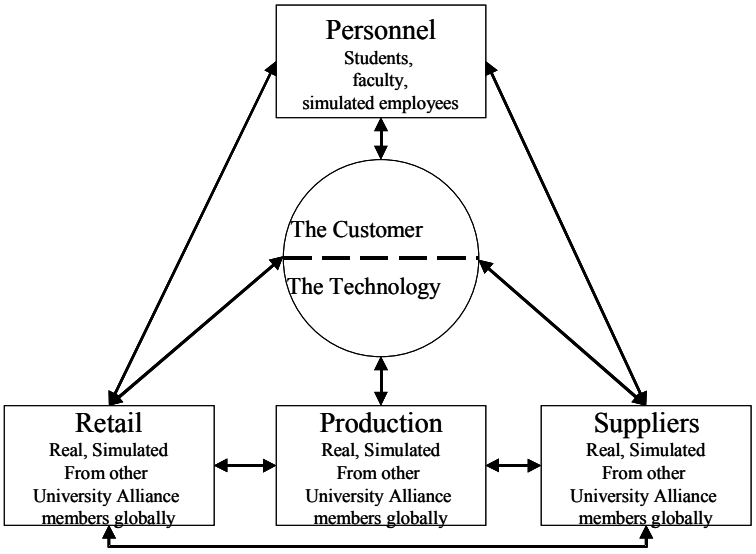

Figure 2. Interactions with the Simulated Business and Engineering Environments

Pilot Project Scope

The pilot project is designed in three phases. In the first phase, the development of a global business scenario will be completed. It will include the creation of a variety of companies at each business level that will participate in this electronic marketplace concept. Each participating SAP UAP member school will be assigned a company and role in the industry. These roles may include OEMs, component suppliers, customers, and subcontractors. Business transactions between these companies will be accomplished through mySAP.com.

This first phase also includes the assessment and development of the technology requirements for this project encompassing both hardware and software. The initial plan is to start with the core SAP modules (mySAP Financials, mySAP e-Procurement, etc.) and expand into the new dimension products as the project matures. This phase is presently underway and due for completion in July 2001.

The second phase of the project involves the actual creation and configuration of the respective companies at the participating universities. It is proposed that each participating member utilize a pre-configured client appropriate for their needs as a means of speeding up the initial process of bringing a company on-line. All configuration required beyond the original pre-configured client will be based on the company-specific requirements developed in phase one. Because of the limited configuration knowledge of some SAP UAP members, support for this activity will need to come from those universities with configuration knowledge or outside parties. Highly scripted testing of the newly configured clients will be undertaken to insure their ability to satisfy the requirements of the project. This phase will culminate with an extensive evaluation and discussion of the implementation of the project to this date across all involved parties. Any necessary changes will be implemented before proceeding to the "go-live" phase of the pilot project. This phase will occur between August 2001 through December 2001. It will involve the installation of required hardware and software, development and configuration of role-based companies, and testing of the communication links between companies (mySAP.com). Scripted testing of the marketplace operations will be undertaken at this time.

The third phase of the project is the "go-live." It is in this phase that students across university and geographical boundaries will be brought together to experience both real-time Enterprise Systems and e-business convergence. This phase is not scripted. It is intended to be a real test of the operations of the SAP SMART marketplace. A final report and analysis of initial student operations of the pilot project will be prepared for discussion and consideration by all stakeholders. The intent of this report is to serve as a catalyst for determining and developing solutions for any issues that may arise with respect to the functionality of the marketplace. In addition, a determination of the feasibility of expansion of the pilot to other schools and/or other new dimension products will be completed. This 'Go live' phase will occur during 200. Students at the initial schools will focus on student operations of the marketplace companies. Assessment of the functionality of the marketplace will be completed. Finally, an assessment of the feasibility of expanding to other schools and/or the addition of new dimension products into the marketplace.

Conclusion

Many institutions are seeking to provide real world experiences in application systems for their students through using Enterprise Systems as exemplar systems, but find that there are limited books and teaching cases that make this task easy. This project will address this shortage by providing a common teaching environment that can be used in the curricula offerings in Information

Systems, business and engineering. This project will be funded by SAP AG and is in its development and pilot phases. Teaching cases will be written using this environment. We believe that this virtual enterprise will be an effective means of working collaboratively with colleagues to design, develop and publish a coherent set of integrated units that will achieve the objectives of the Information Systems Centric Curriculum document, and thus better prepared to meet the needs of 21st century industry. We invite you to consider how you might participate in this exciting international project.

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